Message Text

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ACTION EUR-12

INFO OCT-01 ISO-00 EURE-00 SSO-00 NSCE-00 INRE-00 ERDE-00

ERDA-07 AID-05 CEA-01 CIAE-00 CIEP-02 COME-00 DODE-00

EB-07 FEAE-00 FPC-01 H-02 INR-07 INT-05 L-02 NSAE-00

NSC-05 OMB-01 PM-03 SAM-01 OES-05 SP-02 SS-15 STR-04

TRSE-00 FRB-01 OIC-02 EA-10 NEA-09 IO-10 ACDA-10 /130 W
---------- 058050
O 171657Z APR 75
FM USMISSION OECD PARIS
TO SECSTATE WASH DC IMMEDIATE 6589

UNCLAS SECTION 01 OF 03 OECD PARIS 09800

E.O. 11652: N/A
TAGS: ENRG, IEA, OECD
SUBJECT: IEA: UK AND GERMAN PAPERS ON NUCLEAR COST DATA FOR DISCUSSION AT MEETING OF ALTERNATIVE SOURCES AD HOC GROUP MEETING APRIL 21ST

1. THE IEA SECRETARIAT HAS PROVIDED US WITH THE FOLLOWING UK AND GERMAN PAPERS ON NUCLEAR COST DATA, TO BE CONSIDERED AT THE ALTERNATIVE SOURCES AD HOC GROUP MEETING ON 21ST APRIL. THE SECRETARIAT PLANS TO CIRCULATE ALL FOUR PAPERS AT THE MEETING ON MONDAY:

2. UK PAPER

BEGIN TEXT

STANDARDIZED SYSTEM COST

THE SIMPLE METHOD OF ECONOMIC APPRAISAL OF DIFFERENT TYPES OF GENERATING PLANT WHICH MAY BE INSTALLED IN THE FUTURE IS TO ASSESS THE COST OF EACH PLANT ON A 75 PER CENT LOAD FACTOR BASIS IN TERMS OF PENCE PER KWH. THIS
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APPROACH MAY BE ADEQUATE FOR COMPARING PLANTS WHICH ARE

LIKELY TO OPERATE WITH SIMILAR LOAD FACTORS BUT WILL BE MISLEADING WHEN ALTERNATIVE PLANT HAVING DIFFERENT LOAD FACTORS ARE COMPARED IN THIS MANNER. IF THE 75 PER CENT LOAD FACTOR METHOD WERE USED AS THE BASIS OF ASSESSMENT, GENERATING PLANT HAVING RELATIVELY LOW LOAD FACTORS SUCH AS COAL PLANT, WOULD BE UNFAIRLY PENALIZED COMPARED TO HIGH LOAD FACTOR PLANT SUCH AS NUCLEAR.

THE STANDARDIZED SYSTEM COST METHOD OF COMPARISON HAS BEEN ADOPTED BY THE CEGB SINCE IT CAN BE USED TO COMPARE ALL TYPES OF PLANT, WHETHER THEY ARE LOW OR HIGH LOAD FACTOR PLANT, ON A SINGLE BASIS.

THE STANDARDIZED SYSTEM COST METHOD TAKES INTO ACCOUNT THE COSTS WHICH RELATE NOT ONLY TO THE PLANT ITSELF SUCH AS ITS CAPITAL COST AND FUEL COST, BUT ALSO TAKES INTO ACCOUNT THE CONSEQUENTIAL COST EFFECTS OF ADDING THAT PLANT TO AN INTER-CONNECTED GENERATING SYSTEM.

THE STANDARDIZED SYSTEM COST MAY BE DEFINED AS THE TOTAL SYSTEM COST OF INSTALLING AN INCREMENT OF NEW GENERATING PLANT TO MEET AN INCREMENT IN SYSTEM MAXIMUM DEMAND AND ENERGY REQUIREMENTS.

WHEN A NEW GENERATING PLANT IS ADDED TO THE SYSTEM THE FOLLOWING COSTS ARE INCURRED:

(1) THE CAPITAL CHARGES ON THE NEW PLANT. (C). THIS WILL INCLUDE CONSTRUCTION, INTEREST DURING CONSTRUCTION, INSURANCE, MANAGEMENT AND ADMINI-STRATION, AND ANY FIXED MAINTENANCE CHARGE. TRANSMISSION COSTS MAY ALSO BE INCLUDED IN THIS ITEM.

(2) THE OPERATING CHARGES WHICH ARE INCURRED BY THE PLANT ITSELF AS IT OPERATES IN MERIT ORDER. THESE WILL CONSIST MAINLY OF FUEL AND MAINTEN-ANCE CHARGES. (O).

(3) THE COST OF EQUIVALENT GENERATION OF OTHER
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PLANT ON THE SYSTEM (M). THIS IS IN FACT A SAVING IN COST SINCE IT REPRESENTS THE COST WHICH THE SYSTEM IS RELIEVED OF WHEN THE NEW PLANT OPERATES IN MERIT ORDER.

(4) THE COST OF SUPPLYING THE SYSTEM ENERGY INCRE-MENT. (E). THIS IS THE SYSTEM COST OF SUP-PLYING THE ENERGY ASSOCIATED WITH THE INCREMENT

OF PEAK DEMAND WHICH ITSELF NECESSITATED THE INTRODUCTION OF A NEW INCREMENT OF PLANT. ON A VERY LARGE SYSTEM THIS COST HAS THE SAME VALUE FOR ALL PLANT ITEMS CONSIDERED FOR INSTALLATION IN ANY ONE YEAR.

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ERDA-07 AID-05 CEA-01 CIAE-00 CIEP-02 COME-00 DODE-00

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NSC-05 OMB-01 PM-03 SAM-01 OES-05 SP-02 SS-15 STR-04

TRSE-00 FRB-01 OIC-02 EA-10 NEA-09 IO-10 ACDA-10 /130 W
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THE STANDARDIZED SYSTEM COST C # O - M # E.

THE ABOVE COSTS ARE CALCULATED OVER THE LIFE-TIME OF EACH PLANT ITEM AND A PRESENT VALUE IS FOUND. THE PRESENT VALUE IS THEN ANNUITIZED TO GIVE AN EFFECTIVE AVERAGE ANNUAL COST OVER THE PLANT LIFE-TIME. THE STANDARDIZED SYSTEM COST IS NORMALLY EXPRESSED IN POUNDS/KW/ANNUM.

THE CEGB MAY PRESENT THE STANDARDIZED SYSTEM COST IN DIFFERENT WAYS. THE MOST COMMON WAY IS TO COMBINE (E - M). THIS TERM IS USUALLY CALLED "THE EFFECT ON

OPERATING COST OF REMAINING PLANT ON SYSTEM". A LESS COMMON WAY IS TO COMBINE (M - O). THIS TERM IS NORMALLY CALLED SYSTEM OPERATING SAVING. END TEXT

3. GERMAN PAPER

BEGIN TEXT
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CALCULATING EQUIVALENT OIL PRICE ON THE BASIS OF EQUAL ELECTRICITY GENERATING COSTS IN A NUCLEAR POWER STATION AND IN AN OIL-FIRED POWER STATION

NUCLEAR ENERGY IS ONLY TO A VERY LIMITED EXTENT SUITED FOR A COMPARISON WITH OIL. OIL AND NUCLEAR ENERGY PRICE EQUIVALENTS CAN AT BEST BE COMPUTED ON THE BASIS OF THE COSTS OF ELECTRICITY GENERATION IN AN OIL-FIRED POWER STATION AND IN A NUCLEAR POWER STATION. PRICE EQUIVALENCE RESULTS IF THE COSTS PER KWH OF ELECTRICITY GENERATED IN THE TWO POWER STATIONS ARE THE SAME.

THE STARTING POINT IS A CALCULATION OF COSTS PER KWH IN A NUCLEAR POWER STATION (FIXED COSTS AND FUEL COSTS) DURING BASE LOAD OPERATION. THE EQUIVALENT FUEL COSTS PER KWH OF AN OIL-FIRED POWER STATION EQUAL THE DIFFERENCE BETWEEN THE COSTS OF ELECTRICITY GENERATION IN A NUCLEAR POWER PLANT AND THE OIL-FIRED STATION'S FIXED COSTS PER KWH.

TAKING ACCOUNT OF THE EFFICIENCY OF THE OIL-FIRED POWER STATION, THIS PRODUCES THE THERMAL ENERGY PRICE OF OIL FROM WHICH THE PRICE PER TONNE MAY BE DERIVED WITH THE HELP OF THE CALORIFIC VALUE. IT MAY BE NECESSARY TO ADJUST THIS PRICE FOR SPECIAL QUALITY SURCHARGES, SUCH AS LOW SULPHUR CONTENT, SO AS TO MAKE IT COMPARABLE TO THE PRICE OF CRUDE OIL.

IN DETERMINING THE COSTS OF ELECTRICITY GENERATION IN A NUCLEAR POWER STATION BUILT TODAY, SEVERAL VARIABLES MUST BE TAKEN INTO ACCOUNT, NAMELY

- DIFFERING INSTALLATION COSTS SINCE STANDARDIZATION IS ONLY JUST BEGINNING TO DEVELOP,

- DIFFERING FIXED COSTS DEPENDING ON THE RETURN ON CAPITAL INPUT AND ON THE ESTIMATED OPERATING AND MAINTENANCE COSTS FOR WHICH EXPERIENCE IS LACKING FOR THE MOST PART,

- DIFFERING FUEL COSTS DEPENDING ON THE POINT IN TIME

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TRSE-00 FRB-01 OIC-02 EA-10 NEA-09 IO-10 ACDA-10 /130 W
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WHEN THE FUEL IS PURCHASED.

THE CALCULATION SHOULD BE BASED ON THE FOLLOWING KEY DATA:

- NUCLEAR POWER STATION EMPLOYING A PRESSURE OR BOILING-WATER REACTOR, 1 300 MW NET, CONSTRUCTION TIME 6 YEARS

- OIL-FIRED POWER STATION, 600 MW NET, EFFICIENCY 2 300 KCAL/KWH, CONSTRUCTION TIME 4 YEARS

- ECONOMIC LIFE-TIME 17 YEARS

- BASE LOAD OPERATION.

COSTS OF ELECTRICITY GENERATION(K) IN DM/KWH CAN BE CALCULATED FROM THE FOLLOWING FORMULA: K EQUALS (AP OVER H) PLUS B.

EXPLANATION OF SYMBOLS:
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A INSTALLATION COSTS OF THE POWER STATION (EXCL. FIRST CORE), INCLUDING INTEREST PAYMENTS AND TAXES DURING CONSTRUCTION IN DM/KW, IGNORING PRICE VARIATION

P ANNUAL FIXED COSTS AFTER PLANT HAS BEEN PUT INTO OPERATION IN PER CENT OF CONSTRUCTION COSTS; FIXED COSTS INCLUDE RETURN ON CAPITAL AND CAPITAL DEPRECIATION, CAPITAL-RELATED TAXES, INSURANCE PAYMENTS, OPERATING AND MAINTENANCE COSTS

H ANNUAL OPERATING DURATION

B FUEL COSTS IN DM/KWH END TEXT
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Message Attributes

Automatic Decaptioning: X
Capture Date: 01 JAN 1994
Channel Indicators: n/a
Current Classification: UNCLASSIFIED
Concepts: TEXT, DATA, COSTS, NUCLEAR ENERGY
Control Number: n/a
Copy: SINGLE
Draft Date: 17 APR 1975
Decaption Date: 01 JAN 1960
Decaption Note:
Disposition Action: n/a
Disposition Approved on Date:
Disposition Authority: n/a
Disposition Case Number: n/a
Disposition Comment:
Disposition Date: 01 JAN 1960
Disposition Event:
Disposition History: n/a
Disposition Reason:
Disposition Remarks:
Document Number: 1975OECDP09800
Document Source: CORE
Document Unique ID: 00
Drafter: n/a
Enclosure: n/a
Executive Order: N/A
Errors: N/A
Film Number: D750135-0086
From: OECD PARIS
Handling Restrictions: n/a
Image Path:
ISecure: 1
Legacy Key: link1975/newtext/t19750442/aaaabmsq.tel
Line Count: 306
Locator: TEXT ON-LINE, ON MICROFILM
Office: ACTION EUR
Original Classification: UNCLASSIFIED
Original Handling Restrictions: n/a
Original Previous Classification: n/a
Original Previous Handling Restrictions: n/a
Page Count: 6
Previous Channel Indicators: n/a
Previous Classification: n/a
Previous Handling Restrictions: n/a
Reference: n/a
Review Action: RELEASED, APPROVED
Review Authority: ShawDG
Review Comment: n/a
Review Content Flags:
Review Date: 30 JUN 2003
Review Event:
Review Exemptions: n/a
Review History: RELEASED <30 JUN 2003 by SilvaL0>; APPROVED <29 JAN 2004 by ShawDG>
Review Markings:

Margaret P. Grafeld
Declassified/Released
US Department of State
EO Systematic Review
05 JUL 2006

Review Media Identifier:
Review Referrals: n/a
Review Release Date: n/a
Review Release Event: n/a
Review Transfer Date:
Review Withdrawn Fields: n/a
Secure: OPEN
Status: NATIVE
Subject: IEA: UK AND GERMAN PAPERS ON NUCLEAR COST DATA FOR DISCUSSION AT MEETING OF ALTERNATIVE
TAGS: ENRG, OECD, IEA
To: STATE
Type: TE
Markings: Margaret P. Grafeld Declassified/Released US Department of State EO Systematic Review 05 JUL 2006